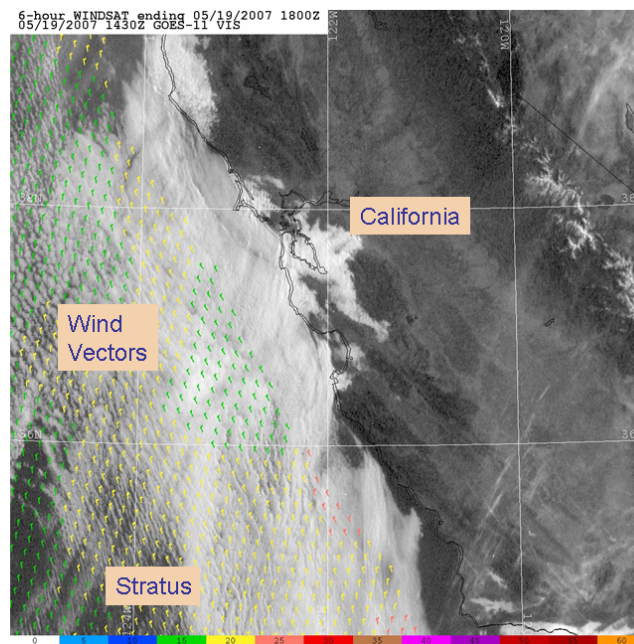




Headliner!

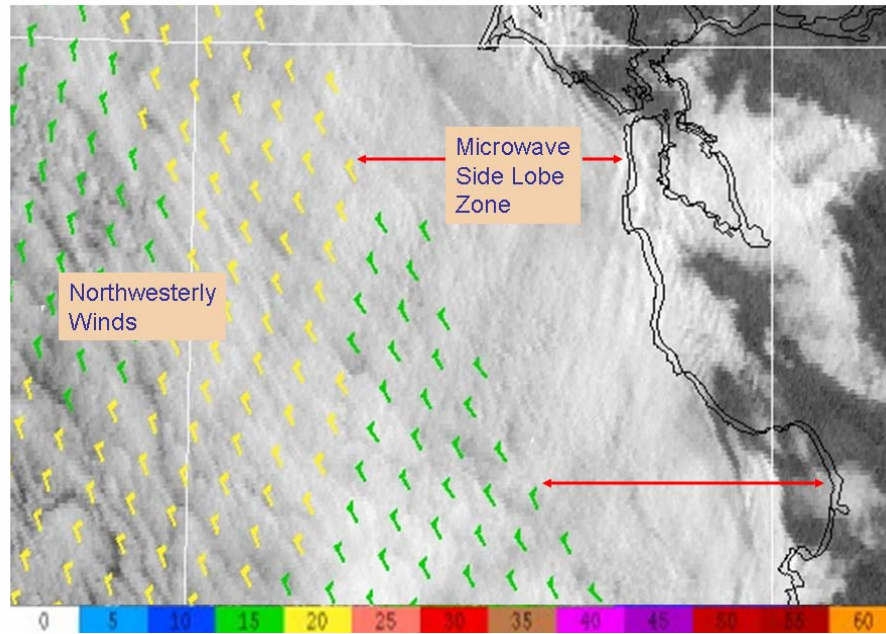
WindSat Reveals Ocean Winds Through Clouds

June 13 2007



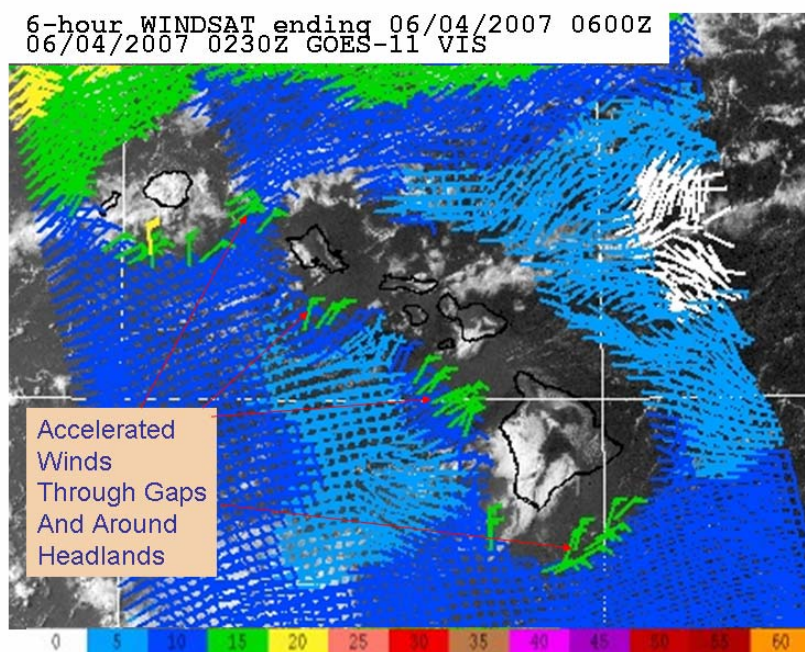
WindSat overlays off Central California

A U.S. Navy Research and Development Satellite Sensor called WindSat, flying on the Coriolis Satellite, can detect wind velocity and speed over the surface of the ocean. The technology is “passive microwave radiometry” by which the sensor receives microwave energy from the surface of the ocean and converts the information into wind data. In the image above the wind vectors are plotted on top of a GOES visible image of the Pacific Ocean off Central California. Although the ocean is cloud-covered, the microwave-enabled WindSat penetrates to the surface of the ocean. WindSat is able to provide winds through all but rain clouds, which are too thick.



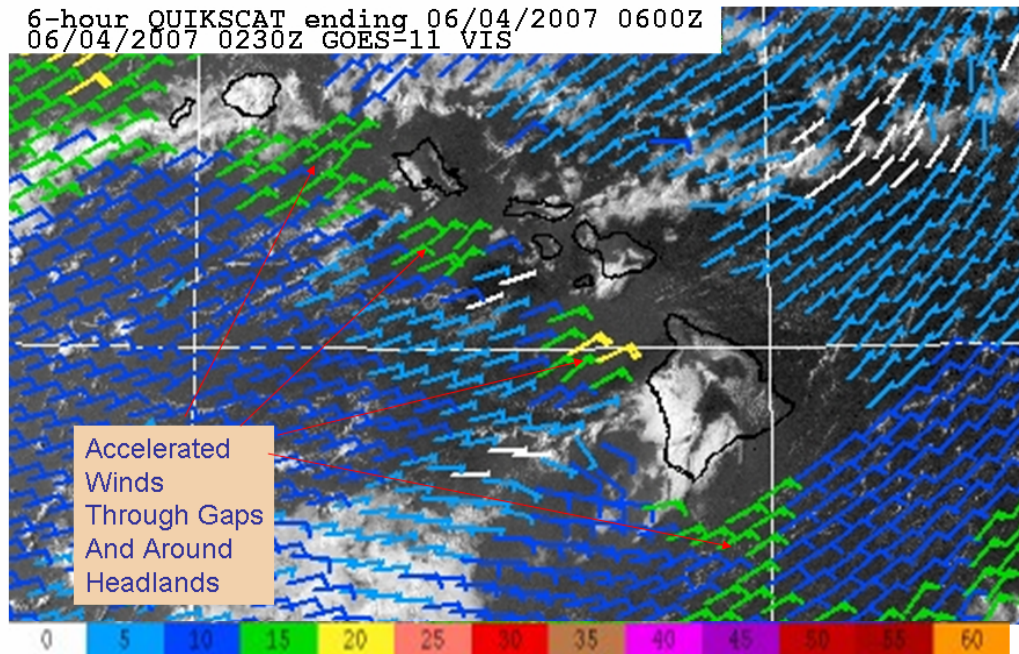
Zoom of Image above

Zooming in on the same image, we can see that each “barb” gives us the wind speed and direction at that point. The barbs point toward the southeast in the product above, meaning that the winds are from the opposite direction, northwesterly. The speed of the wind is given by the scale at the bottom of the product. For example, green vectors show a wind speed of 15 knots. Winds can only be derived over oceans, and not over land. In fact, within about 25-50 km from shore, winds can not be derived over water. Contaminated by microwave side lobes from nearby terrain, this zone is marked by red arrows in the product above.



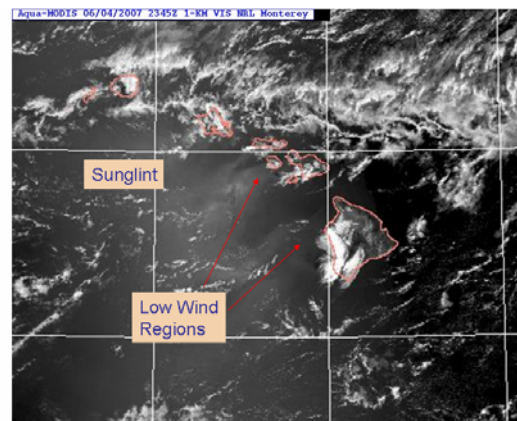
WindSat Overlay around the Hawaiian Islands

Although WindSat can not provide winds over land and over coastal waters, it can sometimes still reveal offshore wind circulations that arise from topography. In the WindSat display above green vectors in the vicinity of the Hawaiian Islands show increased winds moving through gaps in the islands and around headlands. This is important information for weather forecasters interested in conditions between islands.



QuikScat Overlay around the Hawaiian Islands

At about the same time that WindSat viewed the Islands, the orbiting QuikScat sensor imaged the same area (above). QuikScat is a scatterometer meaning that it sends a radar pulse toward the ocean and awaits a return pulse to measure the winds. This is an “active” strategy as opposed to the “passive” strategy employed by WindSat, whereby naturally-emitted radiation is measured and converted into wind information. QuikScat also shows the accelerated winds around the islands. QuikScat has the advantage that it can sense winds closer to land than WindSat.



Visible Image

A MODIS visible image the following afternoon illustrates the gap wind effect observed by WindSat and QuikScat. Since the western (left side) of the image is mostly in sunglint, near-calm regions appear as bright. See, for example, bright areas to the lee of islands. The gaps between islands appear much darker, suggesting stronger winds.

Experimental WindSat Products:

NESDIS WindSat Displays: <http://manati.orbit.nesdis.noaa.gov/windsat/>

NRL NexSat Winds: <http://www.nrlmry.navy.mil/NEXSAT.html>
(Choose Winds button)

COMET Training: http://www.meted.ucar.edu/npoess/ocean_winds/
(Below)

